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NATIONAL WATER POLICY

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NATIONAL WATER POLICY[1]

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National Water Policy should be concerned with the conservation and development of the limited water resources of the country in the best interest of the public. National policy is often confused with federal policy. It should not be. National Policy involves majority agreement of certain basic concepts of water use and control, and as to areas of responsibility of various agencies, groups, and individuals for their implementation. Government must play a predominant part on all levels, federal, state, and local (including quasi Governmental, as conservation districts, watershed councils, etc.). But industry, various associations and groups, and the individual must participate significantly in the formulation and execution of any policies which are to be generally acceptable.

Water Policy involves many facets in the occurrence, disposition, development, use and control of water. Much attention in recent years has been focused upon certain policies and programs related to federal responsibilities, particularly those having to do either with Administrative devices (Valley Authorities, Inter-Agency Committees, etc.) or with fiscal matters (growing federal expenditures, repayment, subsidy, allocation of costs, etc.). These are important elements affecting sound policy, but substantial differences of opinion upon them have perhaps obscured or prevented adequate consideration of many areas of water policy upon which there is general agreement. Indeed in reviewing the numerous reports dealing with water problems[3] which have appeared during the past three years, one is struck with the unanimity of opinion of many aspects of the problem. If some of the heat engendered in past and present controversy could have been diverted to supporting certain specific proposals upon which there is general agreement as to need, even if not of precise implementation, several important results might have been achieved.

One approach to water resources policy is to identify the major segments, to analyze each as to its component parts, and to discuss possible means of implementation. That is the purpose of this paper. If agreement can be reached on some of the less controversial elements involved in a sound water policy, and measures taken to effectuate them, perhaps a step by step approach will achieve quicker results than the shotgun attack. Elements in a water policy will be discussed here in the following order: Data Collecting; Research and Experimentation, Planning, Economics, Legal Problems, and Administration.

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1. Presented before Sanitary Engineering Division, American Society of Civil Engineers, Atlanta, Georgia, February 17, 1954.
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3. A list of some of these reports is appended at the end of this paper.

Data Collecting

Any sound policy involving natural phenomena must have a solid foundation of factual information. We are confronted, in the case of water, with two basic factors, supply and use.

SUPPLY — How much water do we have? How is it distributed in time and area? What happens to it? A statement widely quoted in recent reports to the effect that on the average on continental United States the precipitation is 30 inches, of which some 21 inches (70%) is lost by evaporation and transpiration, leaving only 9 inches as surface or underground discharge is of virtually no significance in the formulation or execution of a water policy. We need to know the amount, intensity, form, and distribution in time of precipitation on all areas from which water is to be gathered. We need to know what happens to this precipitation. How much appears as surface run off in streams, with details similar to those for precipitation? How much infiltrates into the soil, what happens to it, how much can safely be recovered, how much will be lost by evaporation from water surfaces or by evapo-transpiration by vegetation? We need also to know the chemical and biological characteristics of these waters.

The Weather Bureau is the principal data collecting agency with respect to precipitation, and the Geological Survey with respect to surface and ground water. However, according to a report of the National Resources Committee in 1936, there were sixteen divisions or bureaus scattered among seven major departments of the government engaged in collection of basic hydrologic data. Undoubtedly there are more now. The chief functions of the Weather Bureau should be forecasting, climatological studies, and research in meterorology. Eight out of the nine recommendations of the recent Advisory Committee on Weather Services (13) deal with such items. The chief functions of the Geological Survey other than topographic mapping might well be related to geological elements other than water. So too the hydrologic data collection activities of the Department of Agriculture, the TVA, the State Department (International Boundary Commission) and the Treasury Department (Public Health Service), etc., are not fundamental to the major directives of these agencies. Why not a separate hydrologic (water) data collecting agency, whose sole duty would be to establish stations, collect and record data, and promptly publish compilations? This in itself is no mean task, and requires abilities and judgment of a high order. The present agencies try to collect, publish, interpret, and do research with their data. The picture is confusing, and the practice inefficient. It is much as if the topographic mapping branch of the Geological Survey undertook to determine highway locations for interstate highways.

One unit of objective in a national water policy, therefore, might be the establishment of a single federal agency concerned only with the collection and publication of basic hydrologic data, and the investigation of instruments and procedures designed to make such data more accurate or more promptly available. Once the departmental opposition is overcome, it seems obvious that a single federal agency merging the diverse data collecting activities of some sixteen to twenty or more present groups could present a unified program to the Congress which should have more adequate financial support, and surely would have a more unified national support than under the present system.

USE — How much water do we use, and for what? What do we mean by "use" or "consumption" or "take"? What can we forecast with respect to future requirements, at least ten years in the future, and preferably longer? Data here are much more scattered and unsatisfactory than with respect to

supply, and yet if inquires were properly organized probably such information would be more readily and cheaply obtainable. The "consumption" of water for municipal water supply, estimated at from 12 to 15 billion gallons per day, is based upon estimates of population of from 13,000 to 16,746 communities, and estimates of average consumption of from 140 to 150 gallons per capita per day (1) (2) (3) (7) (10). Reasonably precise figures are not known, nor reasonably precise estimates for the future. Such estimates as we have result from inquiries conducted by the U.S. Geological Survey, U.S. Public Health Service, the American Water Works Association and other unofficial agencies. The "use" of fresh water by industry has within three years been variously estimated by responsible sources (1) (2) (3) (9) (11) as from 20 or 25 to 65 billion gallons per day.

Two problems arise: first, the data in both cases are admittedly incomplete and based on problematical assumptions; and second, the words "use," "consumption," etc., are admittedly faulty. "Intake" would be better, for the greater part of the 30 to 80 billion gallons daily involved (the difference in itself a commentary on lack of accurate data) is not "consumed," but mostly is used and discharged and available for further use with or without treatment. "Use" of water by steel plants as reported (10) varies from 15,000 to 110,000 gallons per ton, depending upon extent of reuse. Similarly "use" by ground wood pulp processes varies from 4,000 to 50,000 gallons per ton. Reports presenting such figures properly qualify them as "rough," "crude," etc. How can we devise a sensible water policy without much more accurate information as to use?

A single federal agency having as its primary function the provision of accurate and up-to-date data (not more than one year old when published) on supply and use of water would seem a reasonable first step toward a national water policy. Its statistics would be available to all water using, development, and control groups, public or private, for analysis, amplification, and use for their own purposes. Nothing need enter here except a general desire to obtain the first element of any sound water policy; the facts.

Collection and publication of basic hydrologic data and statistics as to present use have generally and properly been considered to be primarily a federal function. Instrumentation, procedures, and publication should be according to national standards for a variety of obvious reasons. However, various using agencies, both public and private, will have good reason to supplement data from a national network, but whatever their specific needs may be, the procedures should conform to national standards and the results should be adaptable to publication by the federal agency. The extent of the national networks might well be determined by the Research Agency mentioned subsequently and should be federally financed. The supplementary information should be paid for by the using agencies. To a degree this is now done, as for instance by transfer of funds from the Corps of Engineers, State Agencies, etc., to the Weather Bureau and the Geological Survey. However, this is a complicated and sometimes wasteful procedure, and query has been made (1) as to whether the total number of observation stations in some areas of data collecting are not already adequate, and (2) whether better planning and coordination and above all more prompt and complete publication of data would not result in much more effective availability and use of information. State, Regional, and other agencies concerned with water resources have published valuable compilations of hydrologic data and special purpose studies. They should continue to do so, and be assisted by more comprehensive and prompt publication of current data by a federal agency.

Let us assume that any agency, group, or individual can obtain reasonably current and accurate data on how much water we have, and what the present use may be. We then want to know:

What happens to precipitation in various parts of the country under various conditions: How much runs off, how much infiltrates, how much is evaporated, how much is used by various types of vegetation on various soils? Much material on these factors reposes undigested and useless in the files of various federal and other agencies. They have cost much to acquire and are valueless without study and publication. Much more needs to be done on the basis of watersheds. Some of the most enthusiastic advocates of small watershed management practices (upstream engineering?) admit that results of controlled plot experiments are no substitute for recorded experience on complete drainage areas.

How much water is available in vast untapped ground water reservoirs? By what procedures may exhausted ground water be replenished or exhaustion ameliorated? What are the facts as to effectiveness and cost of impounding great bodies of water behind dams with resultant large evaporation losses as compared with storage in underground aquifers with subsequent pumping costs?

Ample evidence exists that in places improved agriculture practices, reforestation, etc., will reduce the net yield of a drainage area. On the other hand they may retard soil erosion with consequent beneficial effects upon the land and maintenance of reservoir capacity through reduced rates of sedimentation. What is the proper balance, and under what variety of conditions?

How may we conserve water in regions of scarcity? What about recharge of ground water from drainage, cooling water, or even with water from treated sewage or industrial wastes? What can be done to educate water consumers (domestic, industrial, agricultural) that a treated waste water used to recharge a ground water supply or for industrial processes may provide ultimately a better water at less cost than water from many a polluted stream now used (after treatment) without objection.

What do we know, and what can we do about supplementary water supplies in regions of scarcity by producing fresh water from saline water?

What about climatic changes? Whether due to this cause or not it was pointed out by Raymond A. Hill (12) that "assumptions frequently made that long-term averages in precipitation or run-off are relatively stable is subject to question, and also to grave danger when used in planning water projects." He stated:

> "When the Santa Fe Compact was entered into in 1922 it was assumed from past records of runoff that there would be a considerable surplus of water remaining after consumptive uses of 7,500,000 acre feet per year in the Upper Basin and 8,500,000 acre feet per year in the Lower Basin. It is now evident that the states of Colorado, Wyoming, Utah and New Mexico in the Upper Basin may physically be limited to depletions aggregating about 6,200,000 acre feet per year and that even to have provided this yield would have required impounding all floods from 1927 to the present time. This reduction in the available supply has been due to the fact that the discharge of Colorado River at Lee Ferry near the head of the Grand Canyon has averaged only 11,700,000 acre feet per year since 1930 as compared to an average of 15,900,000 acre feet per year during the 17 years preceding."

It seems fairly well authenticated that over at least the past thirty years temperatures have been increasing and precipitation and run-off decreasing over considerable areas of the United States. Profound effects may be felt in many present and planned water projects. The sea level has risen from 6" to 9" on various portions of the Atlantic Coast in the past thirty years. Possible effects upon infiltration of saline water to fresh coastal underground waters are obvious as are effects upon coastal erosion and marine structures.

Why peck and pick on these and other problems, which are vital to intelligent water development planning and therefore to water policy? Why not concentrate the major fundamental research and investigation responsibility now scattered through many federal bureaus in a single well financed and staffed agency? Much research and study with resulting publications would remain to be undertaken by state, local and private organizations for special purposes. The relationship might approximate that of the Highway Research Board to state and institutional research on highways and related matters.

Numerous isolated investigations of these and many other important aspects of water conservation and use have and are being conducted, but there is no center where research and investigations of numerous federal, state, and private agencies may be planned, coordinated and reported. Certainly an important step in a national water policy is to have various research programs identified, programmed and correlated, and the progress and results made generally available.

Because data collection, research and investigation are closely related, perhaps a Hydrologic Information and Research Center would be a sensible first step toward implementation of a national water policy.

Planning

It is not enough to know with reasonable accuracy the bare facts about water supply occurrence, use, and needs for the country generally or within regions. Water is in extremely short supply for existing developed requirements in many parts of the country, and pressure upon readily available sources is becoming increasingly acute in many other regions. Demands upon available water resources constantly become more competitive, and planned programs of development are essential.

During the past quarter century patterns of our industrial and social concepts have changed greatly, and always toward increased use of water. Whereas previously municipal water supply, navigation and (in the West) irrigation needs were generally provided by single purpose developments and without much competition one with another, today the picture is very different. Movement of industry has created enormous demand for cheap power, which is also required by increased pumping of irrigation water, the electrification of farms, etc. The great expansion of the chemical industry, and establishment of other new and great water using industries in many parts of the country not previously industrialized have increased enormously the demands for water for such use. The increase in population and its concentration in urban centers has had a similar effect. Tremendous new acreage of lands under cultivation in the West has brought new water requirements, and even in the East supplemental irrigation is rapidly expanding and creating pressures upon local water supply.

To meet these increasing demands on water resources we turned naturally to the concept of multiple purpose developments, where a single large dam on a river could serve to provide for hydro-electric power, diversion for irrigation

water, and flood control. Auxiliary services may include municipal water supply and recreation. If one large development could do these things, the benefits and economy of a series of developments on the same river become obvious. Hence the growth of the idea of planned river basin developments, such as those consummated on the Tennessee and the lower Colorado. But such planning need not preclude single purpose developments for water supply, flood control, power, etc., under non-federal public or private auspices.

Grandiose multiple developments designed to effectuate the utmost in hydropower development, navigation, flood control, and irrigation are spectacular examples of planning on large rivers. But this is not the sine qua non of good water resource planning according to a sound policy. It may not even be good drainage basin planning. Leaving economic considerations for a later section, let us consider some of the other elements in a planned program.

Planning should be upon a drainage area basis, but informed opinion is proving that in many regions too little consideration has been given to relatively small (100 square miles and less) watersheds constituting fairly large segments of a major basin. Considerations of population and occupation trends, best land use, soil conservation measures as affecting amount and quality of water, may all have in the aggregate substantial effects upon the ultimate water production of the larger basin.

The maximum development of surface waters is not the only consideration. Surface and ground waters must be considered together — the effects of one upon the other and the best uses of each.

The needs for water, some of them competitive, for all purposes, must be forecast in the light of all available facts. The means to supply these needs must be canvassed; existing and new sources, re-use, treatment of wastes, ground water storage, importation from other drainage areas, etc.

Certain aspects of a national water policy should be truly national, such as standards for data collecting or bases for economic evaluation. But planning is essentially a local and regional function, and should involve to the highest degree possible the participation of those who are to be benefited (or injured!) by the program.

The Mid-Centruy Conference on Resources for the Future (12) resulted in the consensus of several hundred in attendance at the water resources symposia that "watersheds and drainage basin units have their own individual characteristics, and provide a natural and convenient basis for planning and operations. Their infinite variety requires individual treatment of problems rather than wholesale application of any generalized approach. There is an interdependency between fresh water and land resources which requires that they be considered together in the process of planning and development."

Planning, even when execution of a large plan is predominately supported by federal appropriation, should not be finally determined by a few bureaucrats, in Washington or Denver, however expert. It is conceivable that a national water planning committee might be created under federal auspices (not to be confused with the Board of review mentioned later) which would be constituted of representatives of federal and state agencies and experts unconnected with either, to formulate general criteria for appraising broad water development plans, to interpret them in the light of local circumstances, and to aid regional, state or local water planning agencies in the development of appropriate programs. Experience during the past decade has amply demonstrated that the federal government, either by a special agency, or an inter-agency committee, does not afford the best way to effectuate a water planning program for a drainage basin or region. No existing device appears adequate. Various procedures

have been used and proposed. It is difficult and perhaps undesirable to separate planning from implementation and administration. Doubtless no single pattern will suffice. Perhaps the greatest challenge to ingenuity and good will exists in these areas of water policy.

Economics

During the past decade the most significant, controversial, and readily identifiable question in national water policy has been "who pays and how." This problem seems to be peculiar to federal projects, for nearly all non-federal projects, whether public or private, seem from time immemorial to have planned and operated on the basis of the users or beneficiaries reimbursing capital costs with interest over a period of years. Great municipal water projects for metropolitan areas, municipal power developments such as those for the Seattle-Tacoma region, non-federal irrigation districts in the West, these and others have been developed on that basis. Of course numerous private hydro-electric developments not only do all this but produce a return on the capital as well. To be sure most of these were developed as single purpose projects, but some of the power projects are required by federal authority to provide flood control and navigation benefits, for which of course the power user pays, whether or not he benefits. Many provide important recreational benefits, which generally were not considered in determining the initial financial feasibility.

It is in the vast and growing area of federal multipurpose projects already constructed, under construction, or planned, and involving capital costs of billions of dollars, that the furor of recent years has developed. Opinion outside of federal agencies has come close to agreement on many items, even when philosophical premises were quite diverse. Reports by agencies very different in origination, objective, and personnel (1) (2) agree that economic evaluation of water projects should be based upon complete, accurate, and realistic costs and should utilize uniform procedures for estimating benefits and costs. Also reimbursement should be secured for all direct beneficiaries and for certain secondary benefits; etc. Yet while reports may agree on principle, there is as yet no uniformity of procedure nor indeed is there acceptance of certain of the principles by federal and other agencies responsible for planning and executing large water projects. No elements in a national water policy are more chaotic than those of economic justification and repayment by beneficiaries.

The primary responsibility for this chaos is that of Congress. It has passed many laws authorizing various agencies to prosecute water projects, and has included the vaguest provisions for justification. The 1936 Flood Control Act states projects shall be constructed at federal expense when "the benefits to whomsoever they may accrue are in excess of the estimated costs." The Reclamation Act of 1939 is equally general, and provides that construction may be authorized if a project has "engineering feasibility and if the repayable and returnable allocations . . . found by the Secretary to be proper . . . equal the total estimated cost of construction as determined by the Secretary . . ." etc. Commenting upon these broad legislative directives a sub-committee on Public Works (14) states: "Both of these pieces of legislation are quite general and leave completely to the discretion of the administrative agencies the determination of what constitutes a benefit, how its monetary value should be determined, what amortization period should be used for structures, and what interest rates should be considered applicable for financing."

If not equally vague, the legislative authority for other federal agencies concerned with the development and control of water resources are at least not uniform and comply with no general policy. The Tennessee Valley Authority, the Soil Conservation Service of the Department of Agriculture, the International Boundary Commission, etc., each has its own policies.

Major items in the economic aspect of water projects are: (a) Evaluation, (b) Allocation of Costs, and (c) Payment by Beneficiaries. Evaluation is generally taken to mean the determination as to whether or not a project is justified, and if so its relative priority with respect to other justifiable projects. Justification is usually measured by the ratio of benefits to costs. Engineers Joint Council (1) has recommended that both benefits and costs should be expressed in tangible (monetary) terms and should be accurate and realistic. Net benefits should be used, that is, pertinent costs and damages or losses should be deducted. Project costs should be inclusive, thus all interest charges and taxes should be included and where the project is tax exempt amounts equivalent to taxes should be provided. For justification the benefit-cost ratio should never be less than 4 to 3, and when estimates are subject to considerable uncertainty the ratio should be not less than 2 to 1.

Allocation of costs is the assignment of the total cost of multi-purpose projects among the separate functions such as power, irrigation, navigation, flood control, etc. Because present law provides for little or no repayment of flood control and navigation costs, there is an understandable tendency to allocate undue proportions of costs to power (which is fully repayable with interest, plus), or to other project elements involving substantial repayment. Engineers Joint Council states that allocation of costs in proportion to benefits is improper. Generally the Proportionate-Use-of-Capacity method (17) is recommended.

Payment by Beneficiaries is a procedure by which costs allocated to certain components of a multi-purpose project may, so far as feasible, be repayed by the beneficiaries. As indicated above, present practice on non-federal projects is to secure such repayment, but practice on federal projects varies widely. A large portion of the costs of flood control projects is borne by the taxpayers at large, and the immediate beneficiaries contribute pro rata no more than do the other taxpayers of the nation.

In federal irrigation projects the beneficiaries are expected to repay as much of the capital costs as they can afford, generally within a fifty year period, but without interest. It has been shown (18) that, assuming interest of 2 1/2% on federal obligation, irrigation developments are subsidized by the Federal Government "to an extent of between 45 and 60 percent of the total cost."

Costs of power developments on most federal projects are repaid with interest. Engineers Joint Council recommends that so far as practicable all federal water resources developments should be self-supporting and self-liquidating.

The recommendations of Engineers Joint Council (1) have been used above because this is the most explicit of several recent reports on the economic appraisal of water resources projects. The Water Resources Policy report (2) suggests many of the same procedures as desirable, but differs fundamentally in that it gives substantial weight to social or intangible or other benefits in evaluating water projects. The several Congressional Reports (14, 15, 16) appear to go in the direction of the suggestions by Engineers Joint Council. Certainly they clearly indicate the desirability of uniform policies of economic evaluation and cost allocation for all water projects of all federal agencies.

Such a policy would have important national implications when applied to some five billion dollars worth of water projects now under construction or planned by various such agencies.

Legal Aspects

A great many important elements of national water policy can be formulated and implemented without serious legal implications. Some can not. It is desired here merely to point out some of the legal difficulties in effectuating certain desirable water resources programs. These vary from the local to the international level. Conservation of water for municipal use can be powerfully aided by local statutes or rules dealing with metering, prevention of waste, restrictions on use of water for cooling purposes, etc. Restrictions on amount of water taken from underground sources, requirements for recharging ground water aquifiers, etc., are in effect under state law in many states, and should be in others. The basic laws respecting water rights, riparian or as to priority of use, differ in various states and many informed persons think that while uniform state water codes are impracticable, yet existing codes are very generally in need of modification to fit changed conditions. The interstate compact is frequently a cumbersome device for securing agreement between states for river development. The present congressional furor over the treaty clause of the Constitution has potentialities for making agreements concerning international and boundary waters more difficult than in the past.

No substantial effort has been made in recent years to analyze water laws with respect to national water policy. It is a complicated subject, and is perhaps best left to a time when other aspects of water policy shall have been better formulated than now.

Programming and Administration

Three major considerations have served to place chief responsibility for planning, construction and operation of major river basin programs upon federal agencies. First is the implementation of federal policies established by the Congress, notably those for navigation, irrigation and flood control. The second is the great cost of construction involved, which it is alleged could be met effectively only by federal appropriations. The third is the fact that most of the great river systems of the United States involve more than one state, and a host of conflicting interests of local governments, agricultural and industrial interests, and special groups. Difficulty enough has been experienced because of vigorous differences between federal agencies as to plans for development of a single river system. Complexities involved when other interests are concerned are well illustrated by present conflicts as to the best plan for development of the upper Missouri and the Kansas Rivers.

As indicated above, administration as used here entails planning, construction, and operation. In the majority of water projects, on whatever level, whether single or multi-purpose, or whether basin wide, one agency is primarily responsible for all the aspects. However earnestly one may urge, as does Engineers Joint Council, that "in conservation and control of the waters of the United States . . . that which can be done by the individual should be done by him, and that which requires collective action should be done at the lowest government level practicable," it remains a matter of hard fact that there are only a few multi-purpose projects which have not involved federal intervention. To be sure, during the past two decades factors affecting the political economy

have not been favorable to such developments other than by the federal government and federal sponsorship has been a necessity. That which literally can be "done by the individual" is rare indeed, and probably insignificant.

The individual, the private corporation, the municipality, any organization deriving its powers from the State, will be subject to state legislation. With respect to most developments of any magnitude these state authorized agencies will be subject to federal statutes reposing various regulatory powers in one or more federal agencies under the commerce, or inter-state compact clauses of the constitution. These have been enacted in good faith, and have been exercised to give quite effective control to federal agencies over probably major portion of developments involving surface waters. The federal government therefore exercises significant controls over both planning and operation of many water projects, and under existing legislation will continue to do so.

What the federal government can do when no federal lands and no federal construction are involved is exemplified in the first and second Delaware River Diversion cases. This river and its tributaries affect four states. Various programs for allocation of river waters and for a general basin development have been proposed. None has been accepted by all four states. Proposed compacts having been futile, New York City forced the issue in 1929 by proposing to divert 600 mgd. from tributaries of the Delaware in New York State for municipal water supply purposes. New Jersey and Pennsylvania applied to the Supreme Court of the United States to enjoin this diversion. A Special Master of the Supreme Court heard testimony not only from state agencies, but from federal agencies as to effects upon navigation and shellfish. The court permitted in 1931 the diversion of 440 mgd., and provided requirements for releases and pollution control. New York now seeks to increase the diversion to 800 mgd., and again the matter is before the Supreme Court. Unquestionably the Court will impose added requirements for releases as affecting quantity and quality of navigable waters, as well as attempting to adjudicate differing state points of view. Moreover, as the Delaware is developed, any dams will come under federal jurisdiction (Corps of Engineers) as to effects upon navigation, and under the Federal Power Act as to power production and rates, and as an integral part of a comprehensive river development plan. The Public Health Service and the Fish and Wildlife Service will no doubt be involved as to pollution of ground water supplies and effects upon shellfish respectively. All of this could happen on an intra-state stream, wherever inter-state interests are claimed to be involved. It is just not realistic to suppose that the federal government can be kept out of the planning, or completely out of the operation of any substantial surface water resources developments.

What Engineers Joint Council really meant with respect to everything possible being "done" at the lowest individual, private, or government level, was (a) with respect to financing and operation to reduce the drain on the general taxpayer for benefits to local or special interests and (b) with respect to planning, construction, financing, and operation to curtail the tendency of federal bureaucracies to dominate all water resources developments in the United States.

With all the medley of federal, state, county, municipal, government; private corporation, or individual interest in water resources problems, how do we sensibly, equitably, and economically plan, finance and operate water projects in the best public interests, with the least government domination? This is no mean problem, and none of the various reports cited has come up with a complete answer, save one. The Water Resources Policy Commission (2) provided a simple solution based upon the welfare state directed by an all wise federal

bureaucracy. The water resources of the United States would be administered by a series of River Basin Authorities, which would be essentially independent of local and state governments, and would take over many of the controls now exercised either by these governments or by federal agencies. These authorities would be dominated by Presidential appointees, and would indeed have jurisdiction over all resources, not only water. While the writer disagrees strongly with the philosophy and methodology recommended, the suggestion emerged from a group containing able and sincere men concerned with getting things done without the interminable jurisdictional, legal, special interest and inter-agency conflicts and delays which have impeded sound water resources planning and development in the past.

Surely our democratic system is not so bankrupt in ideas and in execution that a rational solution to the present impasse cannot be found. It must be found on a national, not federal, basis. It can be predicated upon a number of alternative national programs, which must be the result of study and agreement by a national body. It is not a matter of reorganization of government bureaus, although that would be of immense help. It is agreement on policy, with execution of that policy in good faith, that is essential.

To be concrete, and to attempt to indicate one line of approach among many probably equally good or better, consider the following:

1. Creation of a single data collection and publication, research and experimentation agency in the federal government. Properly staffed and financed, it would provide basic hydrologic data from an adequate network of stations. It would provide standards for auxiliary special purpose stations maintained by water resources agencies on every level, and would publish the resulting data. Its research establishment would conduct fundamental studies on hydrologic matters, and would stimulate, guide, and correlate special purpose research by other agencies, mostly non-federal.

2. Adoption by the Congress of uniform policies applicable to federal water projects and relating to fundamental principles of evaluation, allocation of costs, and payment by beneficiaries. A sound and realistic policy of this sort would be adopted readily by non-federal agencies, and indeed such agencies are generally far in advance of the federal practice in such matters.

3. Adoption by the Congress of a policy that the federal government would itself undertake the financing, construction, and operation of water resource projects only to the extent that private capital or lower echelons of government could not do so, either because of serious financial or legal impediments, or because of general welfare aspects clearly defined and appropriated for. Under such a policy and where federal participation was determined to be justified, some program of Grants in aid analagous to the existing federal policy for highway construction and coastal protection would go far toward removing any excessive domination by federal bureaucracies over water development and control.

4. Development of a plan for state water agencies, of a reasonably uniform character and with reasonably similar powers and responsibilities, to insure the maximum of state autonomy in development projects, and to remove as many as possible of the obstacles to inter-state agreements. This item is undoubtedly the most difficult of all to accomplish, but with education and goodwill much might be done.

5. The creation of a federal Board of Review which would be constituted of experts removed as far as practicable from political influences. Virtually all studies of the past few years have agreed upon the desirability of such a Board. It would be charged with considering federal projects from the standpoint of

adequate basic data, realistic estimates of benefits and costs, and relating importance considering economic factors and public needs. Assuming a new policy as to extent of participation by the Federal Government, as for example suggested in Item 3, the Board of Review should be closely related to, and cooperate with, state water planning agencies established under Item 4, as well as with any federal water planning agency.

Obviously no one person can outline a sound national water policy, nor can it be described within the space of a single paper such as this. It is a major undertaking, requiring much time. It must be conducted under proper auspices with adequate representation of federal and non-federal government and private interest. It is an herculean task, desperately needed to be undertaken promptly, and upon the outcome of which may well depend whether or not our limited water resources are to be developed, utilized and managed for the maximum benefit and welfare of our country.

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